

**DIGITAL PRE-DISTORTION FOR THE LINEARIZATION OF  
POWER AMPLIFIERS WITH ASYMMETRICAL CHARACTERISTICS**

**ABSTRACT OF THE DISCLOSURE**

5           Pre-distortion, whose magnitude -- and preferably phase -- are frequency-dependent, is applied to  
an input signal in order to reduce spurious emissions resulting from subsequent amplification of the  
signal. In preferred embodiments, the pre-distortion technique of the present invention is implemented in  
combination with the (frequency-independent) magnitude and phase pre-distortion technique described in  
U.S. Patent Application No. 09/395,490 ("the '490 application"), where the frequency-dependent pre-  
10   distortion corresponds to amplifier distortion that has a magnitude that is proportional to the frequency  
offset from the carrier frequency and a phase shift of  $\pm 90^\circ$  on either side of the carrier frequency. The  
frequency-dependent pre-distortion is generated by differentiating waveforms corresponding to two  
different sets of pre-distortion parameters with respect to time. One of the differentiated waveforms is  
applied to a positive-frequency filter and the other to a negative-frequency filter to generate positive- and  
15   negative-frequency pre-distortion signals, respectively, to account for asymmetries in the amplifier  
characteristics.